

SHORT REPORTS

Frequency, sequence, and side of ovulation in women menstruating normally

Ovulation in the primate is usually regarded as a consistently alternating process that occurs with equal frequency in the right and left ovaries. We investigated whether ovulation in women occurs with equal frequency in each ovary, alternating consistently between the ovaries.

Subjects, methods, and results

Sixteen women ovulating normally who were awaiting donor insemination participated in the study. Pelvic ultrasonography was performed with a real time sector scanner (Advanced Diagnostic Research 4000 S/L) at least once during each cycle as close as possible to the day when basal body temperature was lowest. Ovulation was confirmed by records of biphasic basal body temperature, mean duration of luteal phase of 14 (SEM 2) days, and a mid-luteal plasma progesterone concentration ≥ 38.4 nmol/l (12 ng/ml). Statistical analysis was based on the Bernolli distribution, assuming that in normal circumstances there is a 50% chance of ovulation occurring in either ovary.

A total of 97 follicles was observed in 16 women during 90 cycles. In seven cycles (8%) two follicles were observed, always in the same ovary. Of the 97 follicles, 62 (64%) were detected in the right and 35 (36%) in the left ovary ($p < 0.01$) (table). Alternation of side of ovulation in at least four consecutive

Sequence and side of ovulation in 16 women menstruating normally

No of cycles (No of women)	90 (16)
No of follicles*	97
Right ovary (%)	62 (64)
Left ovary (%)	35 (36)
Alternate ovulations†:	
No (%) of women	5 (31)
No (%) of cycles	22 (24)
Unilateral ovulations†:	
No (%) of women	4 (25)
No (%) of cycles	19 (21)

*Difference between left and right: $p < 0.01$.

†Observed in at least four consecutive cycles.

cycles was found in five women (31%) and in 22 (24%) cycles. In four women ovulation was consistently unilateral from the right ovary during four to six cycles. In cycles with ipsilateral ovulation the mean follicular phase length was 15.2 (0.3) days. When ovulation occurred in the ovary contralateral to that which ovulated in the previous cycle the mean follicular phase was 14.2 (0.3) days ($p < 0.05$).

Comment

These findings indicate that ovulation in women tends to occur more frequently in the right ovary and that the side of ovulation is closely related to the length of the follicular phase, probably being influenced by residual corpus luteum activity of the previous cycle.¹

In a study of eight rhesus monkeys fresh corpus luteum was located in the right ovary in 52 of 86 (60%) laparotomies.² In our study ovulation occurred significantly more frequently in the right ovary (65%). Furthermore, all four series of consecutive unilateral ovulations occurred in the right ovary. This predominance might be genetically determined or result from a difference in ovarian response to extragonadal stimulations owing to differences in vasculature of the ovaries.^{2,3}

We observed alternation of ovulation in five women (31%) and in no more than 24% of cycles. Marinho *et al* examined 15 healthy women and showed alternation of ovulation in 80% of 62 cycles.⁴ Thirteen of their patients, however, were followed for only four cycles, whereas in our study 10 out of 16 women were observed for six or more consecutive cycles. Moreover, in the Marinho study, no information was given about the three women who did not ovulate from alternate ovaries. In our study ipsilateral ovulation was observed in four women and all of them ovulated from the right ovary, supporting the theory that the right ovary is predominantly the site of ovulation.

Our study also indicates that in women the ovary in which ovulation will occur, as well as the length of follicular phase, may be influenced by the

residual corpus luteum activity of the previous cycle. Thus in cycles with a follicular phase of 14 days or less the ovary seems still to be "suppressed" by the activity of the previous cycle, and therefore ovulation tends to occur on the other side.¹ When the follicular phase is prolonged, on the other hand, the ovary may have sufficient time to free itself from this inhibitory effect, allowing ovulation to occur on the same side.

- 1 Wallach EE, Virutamasen P, Wright KH. Menstrual cycle characteristics and side of ovulation in the rhesus monkey. *Fertil Steril* 1973;24:715-21.
- 2 Morse AH, Van Wagenen G. Observations upon ovulation in primates. *Am J Obstet Gynecol* 1936;32:823-32.
- 3 Beyth Y, Winston RML. Ovum capture and fertility following microsurgical fimbriectomy in the rabbit. *Fertil Steril* 1982;35:464-7.
- 4 Marinho AO, Sallam HN, Goessens L, Colling WP, Campbell S. Ovulation side and occurrence of mittelschmerz in spontaneous and induced ovarian cycles. *Br Med J* 1982;284:632.

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Depression and outcome in acute myocardial infarction

A study was performed to assess the level of depression in the first 24 hours after acute myocardial infarction using the Montgomery-Asberg rating scale.¹ The relation between depression and the eventual outcome in terms of both morbidity and reinfarction or myocardial arrest was also assessed.

Patients, methods, and results

A total of 108 patients admitted consecutively with a diagnosis of myocardial infarction was studied. The age and sex of the patient, the site and size of infarction, and the presence of left ventricular failure were noted. The patient's degree of depression was assessed with the Montgomery-Asberg rating scale between two and 24 hours after admission. Patients were classified as depressed if they scored 14 or more on the scale. The degree of pain suffered by the patient at the time of interview was also rated on a scale of 0-3, 0 representing no pain and 3 severe pain.

Of the 108 patients (age range 39-86, mean 62.9 years), 81 were men and 27 women. Infarct size, as measured by cardiac enzyme activities, showed no appreciable differences between patients who were and were not depressed: in those who were depressed aspartate transaminase activity was 210 (SD 167) IU/l (normal range 7-40 IU/l), and lactate dehydrogenase activity 615 (464) IU/l (normal range 100-275 IU/l); in the patients who were not depressed aspartate transaminase activity was 202 (378) IU/l and lactate dehydrogenase activity 467 (337) IU/l. There were also no important differences between the two groups of patients in terms of site of infarction, pain suffered, and presence of left ventricular failure.

Forty eight patients scored 14 or more on the Montgomery-Asberg rating scale; of these, eight men died. Six patients (five men, one woman) suffered either a myocardial arrest with successful resuscitation or further myocardial infarction. Of the 60 patients who were not depressed (46 men, 14 women), one man died and one woman suffered a further myocardial infarction.

Patients were classified into two groups: those with a poor outcome, who died or had a myocardial arrest or a further infarction, and those who survived without any of these complications. A χ^2 analysis using Yates's correction for small numbers ($\chi^2 = 12.2$, $n = 105$, $p < 0.001$) showed the differences between the patients who were depressed and those who were not to be highly significant (table).

Comment

It has been observed that patients who become depressed do poorly. Such observations have been based on only a few patients with obvious severe depression. Studies using psychiatric rating scales have only recently been carried out and have shown a great deal of often unrecognised psychiatric